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East Europe Report

SCIENCE AND TECHNOLOGY

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EAST EUROPE REPORT

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NEW LABORATORIES UNDER ACADEMY OF SCIENCES ESTABLISHED

Sofia DURZHAVEN VESTNIK in Bulgarian 13 Nov 84 p 1053

[Order No 29 of the Office of the Council of Ministers of 25 October 1984 on the Establishment of Laboratories Under the Bulgarian Academy of Sciences, by Chairman of the Council of Ministers Grisha Filipov and Chief Secretary of the Council of Ministers Ivan Shpatov]

[Text] The Office of the Council of Ministers orders the following:

1. Starting on 1 October 1984, the budget of the Bulgarian Academy of Sciences will include provisions for:

a) a Laboratory for Highly Efficient Systems and Algorithms for the Parallel Processing [of Information], with headquarters in Sofia, responsible for basic and applied research on the creation of highly efficient systems and algorithms for the parallel processing of information;

b) a Laboratory for the Creation of Distributed Computational Systems and Computer Networks, with headquarters in Sofia, responsible for the creation of distributed computational systems and computer networks;

c) a Laboratory for the Creation of External Memory Devices based on New Principles, with headquarters in Sofia, responsible for basic and applied research on the creation of external memory devices based on new principles.

9832
CSO: 2202/12

BULGARIA

NEW SM 302 INTEGRATED CIRCUIT DESCRIBED

Sofia RABOTNICHESKO DELO in Bulgarian 16 Nov 84 p 4

[Article by Eng Svetoslav Stefanov: "The SM 302 Integrated Circuit"]

[Text] A team led by Dr Eng Stefan Vulkov of the Department of Electronics Engineering of the V.I. Lenin Higher Machine-Electrical Institute has developed a new MOS [metal oxide semiconductor], the SM 302 integrated circuit. This circuit is designed to measure and regulate the parameters of various electronic and mechanical elements used to determine frequency, to monitor angles and linear acceleration, and to measure atmospheric data. The SM 302 is used in many areas of the national economy, including various monitoring devices of the electronics, machine-building, metallurgical and chemical industries, where it contributes to improving production quality and increasing labor productivity. The integrated circuit is especially useful in agriculture for regulating seeding density.

The new integrated circuit is an original Bulgarian achievement. It is patented and there is no foreign analog. It is already being manufactured by the Scientific Manufacturing Economic Plant for Semiconductor Technology in Botevgrad. It is used in equipment for the technical training of specialists throughout the country. Tests are being run on electronic systems for industrial control developed at the Institute of Radioelectronics in Sofia. It is also being used in systems for monitoring losses during harvesting and in other agricultural applications. The economic effect of introducing the SM 302 is 17,500 levs annually, and once it is introduced into agriculture it will contribute an additional 300,000 levs.

9832
CSO: 2202/12

BULGARIA

DEVELOPMENT OF GEOPHYSICAL SCIENCES OUTLINED

Sofia RABOTNICHESKO DELO in Bulgarian 30 Nov 84 p 4

[Article by senior scientist Dimitur Samardzhiev, director of the Geophysics Institute of the Bulgarian Academy of Sciences: "Geophysics and Space Research"]

> [Text] Geophysics is a complex of sciences that study the physical properties of the earth as a whole, the physical processes and phenomena of its spheres, the atmosphere, the hydrosphere, and the lithosphere. The different branches of geophysics arose because of the human striving for knowledge, for an understanding of nature, and to satisfy the many interests and needs of society.

The rapid development of the different branches of geophysics began in the mid-20th century with the use of new research and communications technology. The year 1958 was International Geophysics Year. In the period 1958-1959, simultaneous geophysical research was conducted over the face of the globe, and new global characteristics of many geophysical elements were obtained. This was the time of the first artificial satellite launchings--the start of the space age. This marked a major change in many branches of geophysics, which began to study the upper atmosphere, the planets and the sun, using techniques and results developed on the earth. This gave rise to the new science of space geophysics.

Direct measurements of the state and composition of the upper layers of the atmosphere and outer space revealed the existence of a radiation zone around the earth and a solar wind, yielded new data on the earth's magnetosphere, on x-ray and ultraviolet solar radiation, and on their interaction with the earth's atmosphere.

The artificial satellites could be used for meteorological observations above the world ocean, the polar regions and other inaccessible areas on the earth's surface, televising large-scale meteorological formations. Rocket probing of the atmosphere to altitudes of 100 or more kilometers produced more accurate information on atmospheric pressure, temperature, density, etc. All of this resulted in a significant increase in our knowledge of the atmosphere, in improved weather prediction, and finally in the development of a new branch of geophysics, space meteorology.

It was found that atmospheric circulation over the entire earth is related to the activity of the world ocean. Accumulating a major part of incident solar energy, it acts by way of the atmosphere on the weather over the entire globe. As a result, oceanographic research is closely tied to meteorological research. The information obtained from the space system for large-scale processes in the ocean, in combination with that obtained from ships, aircraft, etc., is useful in exploring the mysteries of the world ocean as well as in discovering its manifold interactions with the atmosphere.

Geophysical research on the characteristics of the upper atmosphere and the ionospheric propagation of radiowaves, as well as the use of satellites for radiocommunications, have led to the application of ultra-short-wave radio, and the development of a new branch of science--space communications. Long-distance television transmissions and telephone conversations already make use of a system of earth satellites.

Remote control air and space methods of earth research provide ample material for studying the structure of the earth's crust, for prospecting purposes, for studying the distribution of pollutants in the seas and oceans, etc.

In Bulgaria the geophysical sciences began to develop rapidly after the victory of the socialist revolution and especially after the historic April Plenum of the Central Committee of the BCP in 1956. The Institute for Hydrology and Meteorology of the Bulgarian Academy of Sciences [BAN] is working on aspects of meteorology, hydrology and agrometeorology as well as providing relevant information and predictions. In recent years it has also been working on certain problems of space meteorology.

The second geophysical center is the Geophyscis Institute of the BAN, founded in 1960. It does basic and applied research in the physics of the ionosphere and on solar-terrestrial interaction, as well as in other areas of the physics of the lower atmosphere, the earth's magnetism, gravimetry and seismology.

An enterprise for geophysics research was set up under the Committee on Geology for the purpose of applying geophysical methods to prospect for useful minerals. Geophysical research is also being done in the Department of Meteorology and Geophysics of the College of Physics of Sofia University and in certain departments of the Higher Institute of Mining Geology. An Institute for Marine Research and Oceanography was established 10 years ago under BAN. Thus, our country has built up a material basis for conducting modern geophysical research.

The Geophysics Institute of BAN was one of the first to include research into outer space. As early as 1957 and 1958 its coworkers performed radio observations of the first Soviet satellites and obtained the first information, in Bulgaria, on the electron concentration of the ionosphere and the conditions of propagation of radio waves. Ten years later, specialists in the section on the physics of the ionosphere participated in developing the "Intercosmos" international program for research on and use of outer space. The specialized group for designing new equipment

for measuring ionospheric characteristics from on board space ships grew into the Central Laboratory for Space Research. Today, the achievements of this laboratory are widely known--the design of unique experiments on the first Bulgarian astronaut to enter space in 1979, the program for studying outer space with the Interkosmos-Bulgaria 1300 and Meteor-Prirode satellites and our major achievements with the Intercosmos satellites and the Vertikal geophysics rockets. Bulgaria is the eighth nation to enter outer space and the sixth country to place a man in orbit around the earth.

We have an extensive network of stations and observatories which perform continuous observations of the basic geophysical fields. We have created and put into operation one of the most modern and efficient telemetric systems for seismological information in all Euorpe, which lets us immediately determine the characteristics of earthquakes as they occur.

Our research on the physics of outer space and solar-terrestrial interactions, the physics of condensation and crystallization in the atmosphere, and atmospheric diffusion and turbulence enjoy a worldwide reputation among scientists.

Original scientific results, with many practical applications, have been obtained in the area of seismology. Our research and results in magnetism and gravimetry, paleomagnetism and archeomagnetism are highly respected internationally. Our method for analyzing terrestrial-tide recordings has been adopted as the only method used by the socialist countries.

The current rate of development of the geophysical sciences is stimulated by the increasing demands of society for predicting the state of the environment, for the mastery and use of natural riches, for predicting and regulating natural processes, etc. Experience has shown that the best results are obtained through the simultaneous coordination of geophysical measurements using equipment located in satellites, geophysical rockets, and other space equipment, such as geophysical orbiting observatories and earth-based research centers. It is now difficult to distinguish purely extraterrestrial from purely terrestrial observations. The future belongs to comprehensive geophysical research conducted simultaneously from the earth's surface and from outer space.

9832
CSO: 2202/12

BULGARIA

EXPANDED SCIENTIFIC TRAINING OF COMMANDERS URGED

Sofia NARODNA ARMIYA in Bulgarian 6 Feb 85 p 1

[Editorial: "The Officer's Scientific-Technical Horizon"]

[Text] With every passing year the strides made in scientific-technical progress in our socialist land become more vigorous. Electronization has entered various fields of our life in a broad way; it is being turned into a key element of industrial production and scientific research; it strongly influences developments in the military sphere. Modern rockets, tanks, ships, supersonic aircraft, combat helicopters, artillery and other systems, which define the profile of today's Bulgarian People's Army, also create the preconditions for growing complexity in the decisive tasks and the responsibility of each soldier in maximally utilizing the possibilities of the weapons and combat technology. High professional training, a broad military and scientific-technical horizon, the acquisition of knowledge and skills in using electronic technology, in combination with profound ideological-theoretical preparation, are decisive conditions for effective activity on the part of the commander.

The creation of microprocessors has laid the foundation for a new stage in automated control. Miniature built-in systems are able to change the characteristics of exemplary weapons and means of control in a qualitative way. And this changes the character of management activity for the commanders and personnel. The time is not so distant when every military commander will carry in his field bag some miniature electronic devices, with the help of which he will carry out corresponding calculations, depending on the concrete conditions created, in order to obtain the data needed for making a decision. Of course, the commander cannot and must not replace various officers, the specialists and leaders of services subordinated to him. But he certainly must know the capabilities of modern weapons and combat technology and how to use them most effectively in resolving one tactical problem or another on the field of combat.

The foundations of our officers' scientific-technical knowledge are laid at the higher military education institutions. Precisely there future command personnel and engineering cadres master various social and special sciences and become acquainted with the achievements of military technology. Differentiating knowledge in the field of computing technology

and its utilization in military matters posits a number of current problems in organizing the educational process, in harmony with the National Party Conference on high quality in various aspects of life. All educational disciplines must be linked with a methodological concept about using computers in professional activity, in military specializations.

Receiving a diploma is only the first step on the path in a military specialist's maturity in terms of a high level of training. In order to be at the level of contemporary requirements, an officer should be constantly concerned about broadening his technical horizons, about keeping up with the latest achievements in scientific-technical thinking, the most important directions in military matters, and creatively applying his knowledge to solving the varied questions in the lives and activities of the troops.

The experience gained so far at the Georgi Dimitrov Higher People's Air Force Academy, at the N.Y. Vaptsarov Higher People's Naval Academy, in the detachment where officers Dimitrov and Doganov serve, and other places give us a foundation for looking into the future and linking, in a consistent way, the total resolution of the problem of universal computer literacy with expanding these centers to the entire army, with creating constantly active scientific-methodological seminar schools. Mastering revolutionary thought and activity today is difficult without having at least a general sense of the processes and phenomena of various forms of interaction and teaching people with computer technology. For an officer with a broad scientific-technical horizon, the aspiration for exact determinations, single meanings and strictness in formulations, knowing how to express complex thinking with the least number of words, charts, and other means possible, is characteristic.

Despite the undoubted utility of various schools, courses, seminars, and other mass activities, officers' self-education remains one of the most effective forms of perfecting knowledge and expanding their horizons. Many of those serving in the armed forces have large personal libraries, they subscribe to a number of social and scientific-technical journals which help them to keep up with the times and to teach and educate their subordinates fruitfully.

At the same time, officers' self-education needs constant care. Forming the needs in officers to expand their acquired knowledge and master new facts and skills, organizing control over self-education, must be seen as important constituent elements of command, organizational, party, and political work, inseparably linked with the ideological-political and moral education of the troops.

Political organs, party and Komsomol organizations are called upon to devote special attention to these problems and, based on the rich experience gained in the course of the struggle to carry out the resolutions of the 12th Congress of the Bulgarian Communist Party about raising the troops' level of combat readiness, to actively help the commanders in seeking

reserves for further improvement in the efficiency and quality of solutions of military problems. There is no question that a further increase in the technical training of the officers, expanding their scientific-technical horizons, will play a major role in this great matter.

12334
CSO: 2202/13

BULGARIA

NEW PRODUCTS FOR COMPUTERS DESCRIBED

Sofia VECHERNI NOVINI in Bulgarian 18 Jan 85 pp 1, 3

[Article by Mariya Budinova: "Man's Electronic 'Interlocutors'"]

[Text] An expression of the Elektronika plant collective's aspiration to make their production more varied, to satisfy more fully the needs of their clients, is the universal ES 1016 S machine, which has been produced for the first time here. It is used for processing information and can be linked to 30 terminals; it can also be operated by remote control.

The "life" of an article of computer technology is very short. Around the world it becomes obsolete in 2 to 3 years, in Japan, in a year and a half. At the Elektronika plant, in 1985 alone, 24 new items will be implemented. And if a few words are needed to describe what goes on here, they would be: constant innovation of the production or correspondence with the level of production in the most advanced countries in the world, activity in harmony with the collective's aspiration to maintain its position in the international marketplace. Over 90 percent of the items with this enterprise's trademark go abroad.

When asked the question: "What is new at the Elektronika plant?" engineer Ivan Evtimov, the assistant director for technical questions, replies: "After the successfully concluded international testing in the USSR, we will continue the production of the so-called Zvezda network. This consists of three minicomputers from the IZOT-1016 S system, linked by joint work. This opens up broad possibilities for rapid processing in information from various spheres of the national economy. This year we will continue production of universal minicomputers."

What is being done to raise the level of quality? This activity has many directions and is varied. First of all, as a result of many organizational and technical measures, of changing the normative documentation, the reliability of the IZOT-1016 system has been raised by 50 hours of work. This item received the highest marks for quality last year. Thirty terminals can be plugged into it, at unlimited distances, at 10 kilometers for example, and it can process economic, control, and the most varied information.

In order to be in tune with the current requirements, the workers and specialists began the system's modernization simultaneously with its production. A more perfected variant will be implemented in the third quarter. And the result will be higher technical-economic indicators, rapid activity, smaller sizes.

The plant will continue production of the 9003 multipanel system for processing data, and this will also be modernized. The ES-9005 multipanel system for data processing occupies a significant place among computing machines.

It is quicker, quieter and raises the operator's productivity by 20 to 50 percent.

The collective's successful specialization in the field of minicomputer and microcomputer systems, oriented toward concrete consumption goals, continues. The IZOT-1301 micorcomputer, which stores information on diskettes (data carriers which resemble phonograph records), will find application in all branches of the national economy, including education. This year a whole range of items, such as the IZOT-1036 professional microcomputer, will be implemented. What great possibilities it will furnish to specialists in various spheres of life, how much free time it will save them for new creative resolutions! The computer will "shine" in its "consciousness" of possibilities and the state of technological processes, control resolutions, various economic and other problems. But communicating with such a complex machine will require significant intellectual concentration from a person, a great reserve of knowledge.

The Elektronika plant's collective is creating modern technology, but it is also using it skillfully in its everyday activities. Fifteen minicomputer complexes are working in the workshops to help people. Individual systems are adjusted and checked on them; they are used for production. Can it be said that the enterprise in Sofia has raised a barrier against poor quality? Yes. The input control is detailed. Office quality has been created; this unit has already gained experience and is a uniting center for solving problems. The organization of control has been changed: greater trust is being accorded to control in the production process before the item reaches an employee of the technical control section committee. The comprehensive system for quality control is flexible and is being constantly kept up to date.

By tradition, the specialists at the plant participate in the development of all items, together with their colleagues from the Central Institute for Computer Technology. Thus the resolutions obtained are more correct and more appropriate to the technology, the development-implementation cycle is shortened, and there are fewer surprises in the test models. During its testing period, the complex 9005 multipanel system, for example, needed no changes in the documentation.

Of course, the daily activities at a plant such as Elektronika are not without problems. There are over 70 cooperating enterprises. In order to avoid uneven supply, bilateral meetings are organized. Each part or junction brought in from outside is strictly tested. There are difficulties in reorganizing the work.

There are still leaders in the workshops who have not realized that it is unthinkable to get by without the new technology, with all its great possibilities, in the face of the avalanche of ever-growing information. This is essentially a topic for revolutionary thinking: how to change the method of organization, the approach, in order to manage more efficiently. The scope of work at this plant in Sofia ousts such people from positions of leadership. We will soon see the day when a person without a high level of technical and economic knowledge will be as rare as an illiterate person. And this is completely normal here, where electronic interlocutors are created for people in various professions, but the style of work is the same--competence.

12334
CSO: 2202/13

CZECHOSLOVAKIA

TUMOR CLINIC FOR CHILDREN OPENED

Prague RUDE PRAVO in Czech 31 Jan 85 p 1

[CTK report: "Oncology Clinic for Children Opened"]

[Text] An enlarged oncology clinic for children was opened at the university hospital in Prague-Motol on Wednesday. This workplace, unique in Europe, is the first specialized and centralized center for the treatment of tumors in children in the CSSR. It is not only designed for medical prevention, but it also performs a pedagogical function in the training of students of pediatrics at Charles University and in the postgraduate study of physicians-specialists, and is a workshop for basic research. The clinic has 50 beds and is divided into two departments for the children up to 6 years old and from 7 to 16 years old, respectively.

Of great importance for the treatment of tumorous growths, which are the most frequent cause of death in children up to 15 years of age is concentrated care based on accurate diagnosis which, in addition to the professional treatment, also includes follow-up visits.

The capacity of the new clinic will provide perfect care on a high professional level to all sick children in the CSR.

10501
CSO: 2400/279

GERMAN DEMOCRATIC REPUBLIC

RESEARCHERS INTERVIEWED ON CURRENT POLYMER STUDIES

East Berlin TRIBUENE in German 18 Jan 85 p 11

[Thomas Conrad interview with Dr Ludwig Brehmer and Dr Rudi Danz, GDR Academy of Sciences "Erich Correns" Institute for Polymer Chemistry; date and place not specified]

[Excerpts] Every day we encounter plastics in the most varied of forms; for decades already they have been a part of our everyday lives. In recent years they have found new areas of application in the electronics field all over the world. In his report to the Ninth Congress of the Central Committee of the SED, Erich Honecker emphasized that the chemical industry in our nation has in general developed into a refining industry. New levels of refinement must also be achieved, he said, with plastics and elastomers, while at the same time gearing up, scientifically speaking, for the production of additional new generations of microelectronic components.

Scientists at the GDR Academy of Sciences "Erich Correns" Institute for Polymer Chemistry have contributed and continue to contribute to the fulfillment of this far-reaching technical and scientific endeavor. We asked Dr Ludwig Brehmer, scientific department head at the institute, and Dr Rudi Danz about this subject.

[Question] What kind of research work are you doing?

[Answer] In the area of polymer electronics we are investigating the scientific question of the transmission and storage of electrical charges within solid polymer bodies and the possibilities for its technical application. Electrets are therefore a very interesting object of research both in a scientific and technical sense. We have concentrated on developing and producing high performance polymer electrets and together with other colleagues have looked into suitable areas of application.

The undesirable effect of electrical charging in textiles made of synthetic fibers is the heart and soul of an electret, so to speak. A polymeric solid body such as this is capable of binding electrical charges to its surface, thus producing a stored charge. Relatively large charges can be stored in a very stable condition for long time periods of up to several years. At our institute we have been pursuing this problem for some years.

[Question] Would you please give us some further examples of the uses of electrets?

[Answer] The electrical field of an electret can also be very useful in microphones or dosimeters. At present microphones equipped with polymer electrets are being produced in the millions annually. In addition, special films have piezoelectric and pyroelectric properties. This means that the films themselves produce electrical signals (voltages) when they are mechanically stretched or when their temperature is changed. These properties also provide for possible electret applications in sensor technology. The piezoelectric effect, for example, is also used in modern gas igniters.

Together with the GDR Academy of Sciences Institute for Electron Physics we have built, based on a special kind of electret film, a high performance laser detector which measures the energy of laser beams. The film reacts to a laser impulse with an electrical signal which can be measured and further processed electronically. Electrets also react to ultrasound which also stretches the film in rhythm with sonic vibrations. In this way, the intensity of ultrasonic waves, as in medicine for example, can be measured within the human body using hydrophones. These values can then be used in diagnosis.

[Question] Are electrets not also ideal as long-term storage batteries?

[Answer] Electrets can store a large electric potential, but only very low power. Releasing the stored charges would therefore produce only insignificant current. So the electret can be eliminated as a long-term storage battery for electrical energy. In order to retrieve the stored energy one would have to heat such a film, in other words apply thermal energy, and that would completely destroy the electret as a battery. However, there are dozens of other examples in which the actual electret effect can be utilized.

[Question] Is this a starting point for the production of custom-made conductors?

[Answer] Yes, in this area there are some fantastically unique possibilities. It is hoped that one day polymers will be produced which are super conductive but require very little or no cooling, thus capable of carrying electrical current without losses. Super conductive polymers do already exist, but they require a lower temperature than most super conductive alloys and metals. All over the world the search is on for a completely new kind of physical effect which will allow super conductivity in polymers at higher temperatures.

Batteries with polymer electrodes have also been produced. There are even patented designs for producing rechargeable storage batteries made completely of polymers. Such batteries should be on the international market within the next few years. They are substantially lighter in weight and have a greater storage density than conventional lead-acid storage batteries. In the GDR special batteries in which polymers have found various applications are being built for heart pacemakers. These batteries must remain operational for a long period of time within the human body but need to supply only very low power.

[Question] Do plastics with a high degree of conductivity have any advantages over metals?

[Answer] Certainly, if the special properties of polymers are used properly. Their production is much less complicated, their specific gravity much lower, and they can be produced in any shape. Other materials can also be coated with highly conductive polymers. In this way, the important problem of electromagnetic shielding, which is needed for interference-free operation of our radios, for example, and also for microelectronic assemblies, can also be elegantly solved in the case of subassemblies and systems with complicated shapes using highly conductive polymers. In high-voltage insulated cable, too, not only are the excellent insulating properties of the polymer polyethylene used, but it is also necessary to apply certain leveling layers within the cable in order to smooth out any uneven areas on the metal conductor. A conductive version of polyethylene is also used for this purpose.

[Question] Do polymers have other significant electrical properties?

[Answer] I do not want to fail to mention the photoelectric effect here. There are polymers which when exposed to light drastically change their electrical properties, their conductivity for example. This combination of low electrical conductivity in the dark and high photoelectric conductivity when exposed to light opens up the possibility of using polymers for electrophotography. Various electrophotographic processes also for producing images on microfilm using polymers (polyvinyl carbazole, for example) are being refined and are already in use. This means that expensive, limited supplies of silver required for conventional silver halide photography can be conserved.

Moreover, electrophotographic processes are technically and economically very effective and also simple to automate. In electrophotography conductivity is increased at those places where the light strikes a film (electret) which has a uniform electrical charge, allowing the charge carriers to discharge at these areas. This produces a latent image of electrical charges which can be made visible using the proper processes (fixing).

Picture halftones are not yet as good in electrophotography as in conventional processes, but improvements and new possibilities (color electrophotography) are being pursued all over the world. In principle, appropriately doped polymers can also be used as solar storage batteries (solar cells). Whether their effectiveness will approach that of other materials, however, is still the subject of intensive research.

[Question] Has science completely researched polymer electronics yet?

[Answer] Despite the great economic significance of the electrical properties of polymers which has existed in the GDR for years, polymer electronics still finds itself in a very dynamic phase of development. Up to now we have for the most part been able to adapt the electrical properties of polymers to technical tasks using the technology we have. But some basic questions have still not been adequately clarified.

There are also a number of possible applications which are not yet technically feasible. The possible applications of polymer electrets have certainly not been exhausted. In addition, the reasons why these individual effects occur have not yet been fully explained. At our institute we are doing more work in this area. As a result of these investigations we expect to expand further our knowledge of electrical characteristics and the useful properties of the devices and assemblies developed, as well as incorporating new applications in the fields of testing and measurement, robotics, microelectronics, medicine and environmental protection. In the field of polymer electronics our colleagues in the department have published a large number of scientific essays, and over 20 patents protect the results of their labors.

[Question] How do you view the future of polymer electronics in general?

[Answer] This area still has a very bright future and will still occupy scientists beyond the turn of the century. I am thinking only about the modest initial stages of molecular electronics. There is a whole branch of research devoted to using these electrical effects at the molecular level. This means constructing switches, memory units, sensors and other electronic components the size of molecules. Polymers will play an important role here, too.

Silicon-based microelectronics will be singularly dominant in the 1990's and will increase in importance, but its physical limitations are already being recognized. For this reason, there is a worldwide effort to explore the possibility of a suitable technology to replace it.

Molecular electronics is a feasible alternative. This technology means further miniaturization in electronics, however also it is also important to remember that macromolecules form the basis of biological processes. Therefore a successful combination of microelectronics and biological processes may result. This is an area in which intensive work will surely be done in the next few decades. Synthetic polymers can be viewed as a successful first step down this path in scientific, technical and economic terms.

Ludwig Brehmer was born in Zerbst in 1939. He studied physics at the Ernst Moritz Arndt University in Greifswald and wrote his thesis in 1964 on gas discharge physics. He received his doctorate in 1972, writing a dissertation on the electrical properties of special organic molecular crystals resulting from different types of gases at various pressures. Ludwig Brehmer, PhD in the natural sciences, is currently the head of the scientific department at the Institute for Polymer Chemistry.

Rudi Danz was born in 1942 in Bad Liebenstein. He studied physics at the Friedrich Schiller University in Jena. Immediately following his studies, Dr Rudi Danz, doctor of natural sciences, accepted employment as a scientist at the "Erich Correns" Institute for Polymer Chemistry in 1966. His dissertation was accepted in 1970. Since that time the main emphasis of his research work has been in the area of the electrical properties of polymers.

12552
CSO: 2302/60

HUNGARY

MICROCOMPUTERS GAIN GROUND IN BUSINESS

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 pp 1, 3

[Article by Attila Kovacs: "Microcomputers in the Economy"]

[Text] We are in the extensive period of the use of microcomputers. It is estimated that there are about 25,000-30,000 microcomputers of foreign origin in our country today. According to a recent survey the number of mini and microcomputer types developed domestically is 95. Of these 83 are being made in 27 various institutions (enterprises, research institutes, cooperatives and GMK's [work associations]). But with the large variety manufacturing is taking place in extraordinarily low numbers of units. In 1983, 5,100 microcomputers were manufactured in our country. Only three types reached a series size of 300. This year the manufacturers hope to make about 8,000 mini and microcomputers. Capitalist import is relatively significant only in the semiprofessional category. We can import only a small number of machines from the socialist sector.

Despite all this the relatively good program and service supply, the opening of a number of shops selling microcomputers and accessories, an expansion of the possibilities for trying out machines, and individual and network applications in factories, in state administration, in services, in agriculture and in education prove the development of the microcomputer market.

These are the figures which provide a suitable and timely informational framework for the exhibit organized by the KSH [Central Statistics Office] and the SZAMALK [Computer Technology Applications Enterprise] between 11 and 15 September at the Hilton Hotel.

At the opening of the exhibit Lajos Pesti, deputy chairman of the KSH, said the following:

"The purpose of our exhibit is to provide a review--if not a complete one--of the results achieved in the area of economic applications of microcomputers, offering an opportunity to the manufacturing firms and developmental institutes to show a number of concrete applications.

"I am convinced that in a short time mastering the use of microcomputers will be just as important as acquaintance with typewriters or adding machines was earlier or knowing how to drive is today.

"A number of computer technology application tasks can be solved with these machines under substantially better conditions than before, in the immediate proximity of the use.

"The many advantages of microcomputers are well known:

"--They palpably accelerate the spread on a social scale of computer technology applications and thus of electronics, because they direct public opinion and the attention of broad professional strata toward a modern, swiftly developing area;

"--In the producing and non-producing branches of the economy they improve the efficiency of work performance, facilitating the processing of information connected with management, business and technical-scientific activity."

In connection with domestic software development he emphasized:

"The supply of programs running the devices also bears witness to a reassuring development. The computer technology enterprises have already developed a large number of programs satisfying mass needs.

"In regard to devices coming from domestic sources it is justified to take futher steps in the interest of creating a supply market. Today it is possible to get the more sought-after devices only after a long wait. In many cases installation, service and ensuring the software and parts indispensable for operating the devices demand special efforts from the users.

"The peripheral situation continues to be one of the bottlenecks. It is difficult to get a printer well suited to the price and performance of microcomputers and the situation is the same with floppy disk stores. The large capacity magnetic disks are also on the list of shortage items.

"Despite all these difficulties the efforts being made by our enterprises and institutions with the support of our government in accordance with the spirit of the age and economic necessity justify our faith in a development of microcomputer manufacture and use at the desired pace and level."

There was a total of 20 exhibitors--15 enterprises (or subsidiaries), two institutes, one cooperative and one GMK and the Hungarian chess association. Only two of the participants did not figure among the exhibitors at the Budapest International Fair this spring. Foreign participation was represented by the Polish Metronex and Mera Elwro enterprise. Those interested could see a total of 20 different microcomputers (hobby and professional personal computers, home computers and special purpose machines) and also microperipherals.

Among the newly exhibited hardware products mention should be made of the floppy interface equipment developed by the EGSZI [Institute of Construction Management and Organization] which links MOM MF 3200/6400 floppy disk drive units to ES 1022, ES 1035 or ES 1040 computers through their multiplex

channels. The connection is made according to the IBM 3540 algorithm and a data management program called FLAP provides management at the user level. (We will describe the device in detail in a later issue.) The SZAMALK, the SZUV [Computer Technology and Management Organization Enterprise], Comporgan, the Personal A. GT, the OKISZ [National Federation of Artisan Cooperatives] and the SZKI [Computer Technology Coordination Institute], among others offered complex microcomputer services. Videoton exhibited, among other things, the VT-32, 16 bit multiterminal microcomputer system which can be used in an office environment. Unfortunately they will begin series manufacture of this only at the end of 1985. The 512 K byte memory module of the system can be expanded to a maximum of 2 M bytes; it has a modern color display, keyboard and Winchester stores.

The RPC process control program system of the Measurement Technology Software Development Subsidiary Enterprise of the MIKI [Instrument Industry Research Institute] based on Videoton RPT-80 process terminals is worthy of mention. It can be used well to track and check processes, evaluate signals and for every task where the technology is reset periodically or where the control algorithm is only approximately known.

The Interbit Electronics GMK, appearing for the first time, was a pleasant spot of color at the exhibit. The development of their new service is now under way; they are preparing program supplements on cassette or disk for computer technology publications. We could see 45 cassettes at their exhibit. The HT-1080Z school computer of the Signal Technology Cooperative has 64 K bytes of operational memory. Next year, according to the reports, it will be possible to get high resolution and color graphics and floppy disk store interface units for the machine.

The fire protection information system of the NEVIKI [Heavy Chemical Industry Research Institute] is used at the Paks Nuclear Power Plant, among other places. The information system consists of a microcomputer central communications control, data forwarder and remote processor and a data recording system.

Summing up what was seen, we can justly hope that the end to the monopoly situation and the competition produced by the market situation will result in the creation of microcomputer applications according to the needs of the user (and not the needs of the manufacturer or organization providing service).

8984
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HUNGARIAN, SOVIET COOPERATION IN HIGH-TECH FIELDS

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 pp 1, 10

[Article by A.K.: "The Results of 35 Years"]

[Text] In regard to its magnitude and effectiveness the bilateral scientific-technical cooperation between Hungary and the Soviet Union occupies a leading position in the system of scientific-technical contacts between the Soviet Union and the socialist countries. At present 260 Soviet and 200 Hungarian organizations and institutions are participating in the development of more than 350 themes (32 of these stressed themes) in direct scientific-technical cooperation. The chief goal is the concentration of efforts on the solution of key problems of great importance, among others in the areas of communications, computer technology and electronics. This was reflected by a series of programs held in September in Budapest on the occasion of the 35th anniversary of the signing of the Hungarian-Soviet scientific-technical cooperation agreement, which was organized jointly by the OMFB [National Technical Development Committee], the Hungarian-Soviet Friendship Society, the MTA [Hungarian Academy of Sciences], the MTESZ [Federation of Technical and Scientific Associations], the Scientific and Technical State Committee of the Soviet Union and the House of Soviet Culture and Science.

At the opening of the exhibit held in the House of Soviet Culture and Science, V. M. Kudyinov, vice president of the Scientific and Technical State Committee of the Soviet Union, and Lenard Pal, chairman of the OMFB, both stressed the joint results achieved in computer technology. A significant number of these have been realized already in the economies of both countries. Of great significance is the manufacturing specialization agreement signed in 1980 and valid until 1990; thus far, 19 branch programs have been developed as part of this. New achievements have been born on the basis of these programs--for example, the IKOMAT-110, 115 and 200 measurement complex to check LSI circuits, the ES 1061 high performance computer with a processing speed of 2 million operations per second, microcomputerized automatic coke weighing equipment, numerically controlled and highly productive machine tools, a program controlled automated manipulator, etc. It is a significant fact that the Videoton Electronics Factory and the Sigma Factory in Vilnius will jointly manufacture computer technology devices. According to V. M. Kudyinov the cooperating sides must make common efforts in the years ahead primarily in spreading electronics, in the areas of complex automation, peaceful use of nuclear energy, energetics and adopting conserving technologies.

Four domestic institutions exhibited in the computer technology part of the jubilee exhibit. Researchers from the MTA SZTAKI [Computer Technology and Automation Research Institute of the Hungarian Academy of Sciences] demonstrated a link between the computer network of the MTA and the network of the Academy of Sciences of the Soviet Union, with leased line packet switching network access. At the SZAMALK [Computer Technology Applications Enterprise] exhibit one could see the Janus microcomputer, which is based on an NC 1011 microprocessor card manufactured in the Soviet Union. Videoton exhibited its newest VT-1011R field computer.

Technical characteristics of the VT-1011R:

Word length--16 bits
Number of interrupt levels--64
Number of instructions--155
Number of registers--16
Speed of memory bus--2.3 M bytes per second
Maximum storage capacity--320 K words.

The environmentally tolerant machine can be used advantageously, for example, in containers, in trucks or in an environment with a high moisture content. Among the joint applications we might mention the system for controlling and processing geophysical measurements based on the VT-1011R or the navigational location system prepared as a joint development. At the SZKI [Computer Technology Coordination Institute] they exhibited the successful Proper personal computer family.

A scientific session was held at the Hungarian Academy of Sciences on the occasion of the anniversary. In his lecture Academician V. A. Melnyikov, director of the Moscow Cybernetics Institute, stressed the changes in computer categories produced as a result of the great development of microelectronics. In the years ahead he considers important the fifth generation computer program and an ever larger volume manufacture of problem-oriented computer systems. These will require a simplification of operating systems and programming and a significant increase in memory capacity. We must create matrix processors and processors solving combinatory tasks. The large systems of the future must be surrouned by local nets creating a direct link with the user. Additional significant tasks are: automation of software development and computerized designing; close cooperation with industry; introducing new cooling methods in computers; and a further increase in reliability and operation speed.

In his lecture K. V. Frolov, corresponding member of the Soviet Academy of Sciences dealt with the problems of optimal driving of robot systems, problems not solved adequately anywhere in the world. He stressed the questions of energy consumption, vibration (self-frequency), the development of conveyor systems and the possibility of automatic measurements during operation in the creation of factories without people.

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HUNGARY

MULTI-AXIS MACHINING PROGRAM

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 p 14

[Unsigned notes: "News Mosaic--Monthly Chronical"]

[Text] Experts of the Electric Automatics Prime Contracting and Manufacturing Enterprise have developed a microcomputerized control with which one can control complex movement combinations on the newest, multi-axis machine tools. With the new automatic device one can move simultaneously and in coordination with one another the five axes of these machine tools--for example, the carriage, the circular table or the cutting head. Thus one can form the workpieces into the most varied geometic shapes on these machines, with very great precision and productivity. The automatic devices manufactured here up to now have handled the coordinated control of at most two or three axes and with these one could not finished complicated workpieces. With the new control the machine tools are capable of executing very complex movement combinations so preparing the programs controlling their work is not a simple task. Without the aid of a computer the programmer would get lost in working out the details. For this reason they also developed a programming station for the control at the VILATI [Electric Automation Institute]. A description of the formation of each geometric surface can be fed into the memory of this, defining the tasks of the machine virtually millimeter by millimeter. The course of the work as a whole can be compiled from these so-called auxiliary programs. Workers at the Budapest Technical University developed or are developing the auxiliary programs. According to the plans the VILATI will supplement with new automatic devices the products of the Machine Tool Industry Works in the future. The first such equipment, developed jointly, is already in test operation at the Budapest Technical University. In December the experts will demonstrate SZIM [Machine Tool Industry Works] machine tools equipped with the VILATI controls in Esztergom. Series manufacture of the controls, or rather the new type machine tools, will begin next year.

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HUNGARY

CONTROL FOR REPLACING NUCLEAR POWER PLANT ROD CASES

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 p 14

[Unsigned notes: "News Mosaic--Monthly Chronical"]

[Text] Experts from the United Electric Machine Factory and the Computer Technology and Automation Research Institute have jointly developed a second generation of electronic controls for nuclear power plant cassette reloading equipment. In the new version a microprocessor guides the exchange of the fuel elements. In the future the EVIG [United Electric Machine Factory] will manufacture these further developed electronic controls and ship them to nuclear power plants being built in CEMA countries. In becoming acquainted with and developing further nuclear power plant technology the experts of the EVIG have gained experience which can also be used to modernize their traditional products. Their product development plans include use of a microprocessor to make more modern drive systems for machine tools. As a result of their developments thus far they are already delivering systems with which the operator of the equipment can continually control, during operation, the rpm of the motor and thus the output of the machine. Hereafter, use of a microprocessor will make it possible for an automatic device to control all this according to a program for each machine, for example for metal cutting machines. Experts of the EVIG, together with colleagues at the Budapest Technical University, are studying possibilities for ever broader use of microprocessors.

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HUNGARY

WORKPIECE RECOGNITION DEVICE

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 p 14

[Unsigned notes: "New Mosaic--Monthly Chronicle"]

[Text] Experts from the Computer Technology and Automation Research Institute have developed a so-called "intelligent eye-hand system" suitable for recognition and automatic movement of workpieces. The system consists of form recognition equipment, manipulators capable of moving the workpieces and a control computer. It is the result of domestic development and up to now could be obtained only from abroad. The sensing equipment of the system, which obtains image information with the aid of an industrial television camera, can distinguish or identify objects placed on the work table on the basis of a computer program. The equipment can "note" objects of any form--within a given size range. It is taught this with a prior, one-time showing of the objects. The computer records the data concerning these and thereafter the equipment recognizes at any time the form of the objects already learned. After identifying the objects, arriving at different times and in unordered positions on the conveyor belt, a manipulator, having what is called six degrees of freedom, automatically places the objects in the desired position or, if the computer program prescribes it, it sorts them by size. A degree of freedom means how many directions the "arm" of the robot is capable of making movements in. According to the experts the new system, whose working model already exists, can be a real help in machine manufacture and in belt work therein.

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HUNGARY

HUNGARIAN SYSTEMS CONTROL EQUIPMENT

Budapest SZAMITASTECHNIKA in Hungarian Nov 84 p 14

[Unsigned notes: "News Mosaic--Monthly Chronicle"]

[Text] Series manufacture of domestically developed computerized systems control equipment has begun in the Electronic Measuring Equipment Factory. The equipment has four microcomputers, a picture screen display and magnetic disk background storage and can be connected to special printer output equipment and standard measuring equipment. The computer, using the BASIC programming language, is also suitable for technical and scientific calculations, for computerized aid to engineering design work and for control of complex, automatic measurement systems. Last year they manufactured the first 30 units of the EMG 777 device which constitutes the basis of the system; testing of these proved successful, so they began series manufacture taking the experiences into consideration. They are being used primarily to control measurement systems in the National Measurements Office and in the Electric Industry Research Institute. In addition the equipment can be used well for computerized design; for example, in the Heat and Systems Technology Institute of the Budapest Technical University they are using the equipment for thermal calibration of various electronic devices in order to design optimal layout of electronic parts during operation and placement of the necessary cooling equipment. The special computer program package belonging to the equipment can be used in many areas of engineering work. This package makes possible computerized spatial design of various objects--for example, buildings--and picture screen display of the planned object. The chief strength of the device is its multiprocessor construction, consisting of four microcomputers, which is unique among domestic developments and is regarded as modern even by international comparison. With it a number of parallel processes can take place simultaneously: for example, while the main processor evaluates the data and carries out the necessary calculations the display processor continually feeds to the screen the momentary--graphic or data--result. It is probable that domestic users will operate the units of the series manufacture which has begun now but talks concerning foreign sales are under way also.

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HUNGARY

HUNGARIAN SOFTWARE FIRM IN PARIS

Paris ZERO UN INFORMATIQUE in French 15 Oct 84 p 16

[Article signed C.I.: "PROPER, or the Hungarian Gray Matter"]

[Text] To develop its relations with France, the SZKI Data-Processing Coordination Institute of Budapest just set up a subsidiary in Paris: PROPER,* a limited-liability company.

PROPER, i.e. "PROgiciels PERformants" [High-Performance Software], was set up to market in France new software packages developed in Hungary.

Headed by Laszlo Binder and Fischer, this creation is the result of long-time cooperation between France and Hungary in the field of data-processing. Although Hungary is not a great power when it comes to electronics, it still appears to be the birthplace of famous scientists, in particular in data processing (see ZERO UN HEBDO No 789 of 20 February 1984, pp 42 and 43).

Therefore, it is in the best interest of both parties to trade research and development results and especially data-processing products. To make this trading easier, the French company headquartered in Paris was set up.

According to L. Binder, it will be in charge of "relations between the French and Hungarian partners, although its operations will not be restricted to that." Actually, PROPER offers a wide range of high-performance software designed in Hungary and elsewhere, "which can enhance the operational efficiency of hardware made or sold in France."

The software packages offered naturally cover software for personal computers. There is a very strong demand for this type of software from teachers, small or medium-size firms, and from large individual and trading companies.

If, as L. Binder pointed out, "the use of large business computers no longer involves major problems, efficiency in using them is still becoming increasingly critical."

* PROPER: Commercial Section of the Hungarian Embassy (Tel. 704-76-46) and CITH [Hungarian Technology Information Center], 88 Avenue Kleber, 75016-Paris (Tel. 553-75-19).

This is why PROPER is offering many programming tools, software engineering tools, high-level languages and assistance in their implementation. It provides this assistance in close collaboration with IGL (Software Engineering Institute).

Hungarian Software

PROPER is assuring its French partners that they will have access to the results and capacities of a large Hungarian software group. This group also has over 2,000 contributors (analysts-programmers) and a large data-processing capacity.

PROPER is representing several Hungarian software companies in France.

A few example of PROPER's "High-Performance Software":

- in the field of datacom and office-automation tools, we should mention Teledat, a local videotex service for personal and business computers;

- in application fields such as remote trading, inventory management, seat booking, S-Text is a sophisticated word-processing system;

- for computer-aided design and management tools, we should mention Labsoft, a modern integrated system for chemical laboratories; Batisoft, a series of programs to compute loads, strains and displacements; Octopus, an open-ended information system handling a body of data whose characteristics are set up using complex research keys; among software engineering tools, let us mention MProlog, a modular interactive system for the development and implementation of programs consisting of several modules in Prolog language; TProlog, a simulation system based on MProlog; Qualimeter C, a quality-control and documentation system for programs in high-level languages.

Finally, as far as the services offered are concerned, note that, as subcontractors, the Hungarian experts will undertake to carry out in full or in part projects such as: application of system software, database management, telecommunications, terminal emulation. We should also point out that all software packages are presented directly in French, as needed.

MProlog: A Prolog-Program Development Tool

MProlog, derived from Prolog, can be used to design practical programs because:

- it is fast;
- programs can be broken down into modules;
- it embodies a large number of procedures;
- its environment is well-suited to program development.

Thirty or 40 MProlog systems have already been set up throughout the world (Europe, Japan, Canada) and are used both in universities and in industrial research and development units.

MProlog is distributed by professional software companies in several countries. As is known, Prolog is a programming language based on logic programming concepts developed in Great-Britain and France in the early 1970's. It is well-suited to research on artificial intelligence and expert systems. Prolog has been selected as a core for fifth-generation language for Japanese computers.

MProlog is a leading industrial-quality software programming system, with software-development aid adapted to the applications offered to the market of artificial-intelligence users.

9294
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HUNGARY

GOALS OF NEW LONG TERM SCIENCE RESEARCH PLAN

Budapest NEPSZABADSAG in Hungarian 9 Feb 85 p 9

[Article by Istvan Lang, delegated first secretary of the Hungarian Academy of Sciences: "Long-Range Trends of Domestic Scientific Research"]

[Text] For the past decade and a half the direction of domestic scientific research and technical development has been determined fundamentally by the science policy guiding principles adopted by the Central Committee of the MSZMP in 1969 and still in force today. Based on these guiding principles the Council of Ministers adopted in 1972 the National Long-Range Scientific Research Plan, in connection with which the thinking originally was that it would apply to a period of about 15 years, but could be modified in accordance with the new developmental needs of science.

The long-range research plan contained five chief research directions and eleven research target programs at the national level. Later this was expanded with two additional research tasks.

Thus far the National Long-Range Scientific Research Plan has had an orienting and organizing effect and to a certain extent an effect of concentrating economic and intellectual resources on scientific research and technical development.

When the Political Committee of the MSZMP reviewed the implementation of the science policy guiding principles in 1977, and took a stand in a number of questions for the period ahead, one of its important findings was that the tasks set forth in the 5-year economic plans and the goals of research and technical development must be brought into harmony better.

In accordance with this, when the Sixth 5-Year Economic Plan was being prepared in 1978, the Council of Ministers decided that there was need for a medium-range stressed research and development plan which would serve the realization of concrete economic and social goals, the results of which could be used even in the given 5-year economic plan cycle or which would lay foundations for developments

in the next 5-year plan. Thus the National Medium-Range Research and Development Plan came into being as part of the Sixth 5-Year Economic Plan. The research programs formulated in this are still being carried out. The system of national level medium-range research and development programs has proven itself, and so a new medium-range research and development plan is being prepared as part of the Seventh 5-Year Economic Plan also. In a certain sense this has created a unique situation: Plans with two time ranges--medium-range and long-range--have developed, each with its own peculiar institutional system (program councils, committees, etc.).

Stressed Tasks

Both plans have meant the stressing of tasks at the government level. For this reason it has become timely to review the longer term scientific research plan and modernize it in harmony with the long-range developmental ideas of the national economy. Experience has shown that a period of 15 years requires not so much a "plan" as a document of a "directional" character with the aid of which research and development plans for a shorter period (5 years) can be made concrete.

The document titled "Long-Range Trends of Scientific Research" was prepared as the result of several years of preparatory work, bringing in a broad range of experts and making use of the recommendations of professional public opinion. The draft of it was debated by the Hungarian Academy of Sciences and a plenum of the National Technical Development Committee and the 1984 general meeting of the Academy also recommended its adoption. The compilation was discussed in November 1984 by the Science Policy Committee and at its 17 January 1985 session the Council of Ministers adopted it as a working document.

This document consists of two parts. The first part contains the long-range, comprehensive science policy principles of the government. The second part describes in detail the long-range trends of scientific research. In regard to the latter the experts worked out in detail two basic research trends and more distant research trends connected to nine social-economic complex tasks.

The complete document will be published soon and will be accessible to the scientific public. But until then, let us review the chief lines of this extraordinarily important document.

With More Modern Tools

The new long-range research plan, as its name implies, has a trend character. It does not contain narrowed down themes and tasks but rather designates problem areas which are of key importance from the viewpoint of social progress, the solution of which is not possible without the intensive contribution of

science. It portrays the scientific research aspects of social, economic, technical development and environmental protection problems and those chief trends which may represent the most important areas of scientific work and research in the next 15-20 years.

The plan is open both in its spirit and formulation. It establishes unambiguously that it reflects the trends which are felt to be most important according to the present position of science, according to the present level of our knowledge. Because of the nature of progress and the possibility of unexpected scientific discoveries it is probable that it will be necessary to review and change this plan from time to time.

The science policy principles of the government are also formulated in the document. Within this framework they have dealt with the material expenditure questions of R and D activity, the organizational, guidance and institutional system and the development of international scientific contacts.

The document does not assign material resources to the several research trends. Establishing these is the task of the medium-range plans of the time. But it does formulate the position that it will continue to be necessary to determine R and D expenditures within the framework of national economic planning work as a percentage of the internal use of national income. It must be made a goal, when making longer range decisions, that up to the end of the century the level of the supply of instruments and equipment per researcher should approach the values which have developed in industrial developed countries of small and medium size. It must be kept in mind that the tool needs of the social sciences (for example, the use of computers) are increasing vigorously. In some areas--such as, for example, materials research, computer technology and biotechnology--the operation of new, large, modern equipment is an indispensable condition for competitive research.

The Role of the State

The document outlines the role of the state in the guidance of R and D activity. The government continues to regard the development of basic research, the modernization of higher education, building up the scientific infrastructure and support for, espousal of and influence over long-range applied research of national economic significance as state tasks. On the other hand, the organization and realization of R and D activity with immediate economic goals is the task of managing organs, of the enterprises. The role of the state in these areas is limited to the development of environmental conditions.

In regard to the institutional system for research the document hopes to realize a principle of selective growth; a significant modernization of the material-technical tools must be carried out with personnel improving in quality but not substantially increasing in number.

The character of research, the many types of research, requires organizations capable of changing flexibly. Subsidiary enterprises, various forms of associations, and technical development (engineering) enterprises carrying out intermediary functions will play an increasing role. What is most important, however, is to increasingly link the universities and colleges into the solution of R and D tasks and to strengthen the enterprise and inter-enterprise research sites. It must be kept in mind that by the turn of the century the role of research sites which operate very valuable equipment for national goal use will strengthen.

In regard to the cadre policy questions of research the realization of performance orientation, a strengthening of democratism, the selection and education of scientific leaders, aiding a constant influx of creative, talented experts, of young people, and improving postgraduate training are constant tasks. The possibilities of foreign scholarships and jobs must be exploited in a more planned way and in a broader sphere.

The basic principle for the development of international scientific contacts and cooperation is harmony with the economic policy and foreign policy goals. In certain areas of domestic research, which have won worldwide recognition, it would be good to urge the creation of international research shops, collectives or research undertakings (operating with a temporary or permanent character).

Going beyond the exchange of new scientific and technical information, international scientific cooperation has an important role in the solution of tasks deriving from the common goals of the socialist countries, in the international ideological struggle and in strengthening the positions of socialism. The primary goal of cooperation with the developed capitalist countries is to realize--mutually advantageous--joint actions and undertakings in the take-over, introduction and joint further development of the modern techniques and technologies needed in domestic economic development and in the exchange of experts.

The Obligations of Scientists

The document deals in a stressed way with basic research and prescribes an increase in support for it. To a large extent the research aspects of problems and trends judged to be of key importance socially are also basic research problems, but in most cases they have an interdisciplinary character. It is also absolutely necessary, however, that the disciplinary basic research be conducted on a broader front--with the rational concentration of material resources. In this area the most important factor is man--the scientific personality, the talented person, the ability to create a school, scientific accomplishment recognized by the science of the world as well.

The trends also mark out natural science and social science basic research themes of great significance. Within the framework of these the chief goal is

discovery of new information deriving from the internal development of the natural sciences, and social theory research laying the foundations for political, social and economic decisions is important.

The trends and problem areas are as follows, characterized by the title words--development of tools for computer technology, signal technology, automation and informatics; discovering natural resources; rational energy management; research on new materials and technologies; biological, medical and health research; increasing agricultural yields and the efficiency of the foodstuffs economy; environmental protection; modernization of the Hungarian society, economy, state organization and public administration; raising the cultural level of society, increasing public culture and modernization of education. All of this makes clear how timely the guides of the science policy guiding principles are even today: "A scientist has obligations to his people and his country," a resolution of the Central Committee of the MSZMP established in 1969. "The Hungarian people building socialism justly expect from the cultivators of science a commitment to socialism, to social programs." The document now adopted applies this spirit to our present day and provides the necessary tools to carry out the tasks as well.

8984
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COMPUTERIZED GAS DISTRIBUTING SYSTEM

Budapest MAGYAR HIRLAP in Hungarian 21 Feb 85 p 8

[Summary] Data from 150 high-pressure distributing, controlling and receiving stations is transmitted to GOV [Gas and Oil Distributing Enterprise] at Siofok. GOV's four regional centers monitor 85 percent of all existing stations. GOV's system provides reliable, up-to-the-minute information about the condition and operation of equipment at the various stations as well as the amount, quality and pressure of the gas they process. The system operates with the aid of two computers developed by the Central Physics Research Institute.

Instrumentation for controlling and monitoring the domestic gas network was manufactured by MMG AM [Automatics Works of the Mechanical Measuring Instruments Factory] which supplied most of such instrumentation for the CEMA gas networks. Although four levels of technology are incorporated in the Hungarian telemechanical network, this does not disrupt operations because a microcomputer designed by MMG AM converts and unifies the signals so that identical electrical signals are received from all stations. The computers required to operate the control system and the equipment which processes the signals for the computers were developed by the Central Physics Research Institute.

The first system similar to that used by the GOV was adopted in the developed capitalist countries in the seventies. Hungary is the first of the CEMA countries to have a computerized system for controlling its gas network. It is unique in its category.

CSO: 2502/29

HUNGARY

LINK TO SOVIET, INTERNATIONAL DATA BANKS OPERATIONAL

Budapest NEPSZABADSAG in Hungarian 5 Mar 85 p 3

[Text] The remote data transfer channel which links the Electric Power Industry Research Institute of Hungary with the computer center of the Automated Information and System Technology Research Institute (VNIIPAS) of the Soviet Union was officially inaugurated on 4 May by Laszlo Kapolyi, minister of industry. It gives Hungary access to the computerized information technology system network of the USSR. The channel makes possible establishment of connection with 15 large computer centers including that of the Central Scientific and Technical Information Center which has 28 data banks. With the aid of the Moscow institute, the Hungarian computer center will have remote data connections with the data banks of socialist countries as well as those of several developed capitalist countries.

In the coming years the Soviet Union intends to continue building up its computerized information network and expanding its data banks and information exchanges with computer centers of both socialist and capitalist countries. According to Oleg Smirnov, director of VNIIPAS, Czechoslovakia and Cuba spent 346 and 360 hours respectively exchanging information with the computer center of the Soviet network. Mongolia and Vietnam access the data banks of the Soviet Union and other socialist countries via telecommunciation satellites. The Moscow institute makes various programs and automated data banks available to its partners. Information provided includes technical, scientific, foreign trade fields and data from the literature as well as analyses and studies.

Fruitful cooperation aimed at establishing the computerized remote information system has been in progress with Hungary since 1980. Operation of the Budapest-Moscow computerized information link was demonstrated at the inaugural ceremony.

CSO: 2502/30

ROMANIA

ACHIEVEMENTS, PROSPECTS IN CHEMICAL RESEARCH

Bucharest ERA SOCIALISTA in Romanian No 1, 10 Jan 85, pp 17-20

[Article by Maria Ionescu, director general of the Central Institute for Chemistry: "Future Achievements and Objectives of Chemical Research"]

[Text] The 13th Party Congress, an event of historical importance in the life of our people, drew up the strategy for Romania's economic and social development for the future 1986-1990 five year plan, as well as the main directions until the year 2000. The documents of the congress and, first of all, the magnificent report presented by comrade Nicolae Ceausescu, the secretary general of the party, clearly show the basic role of scientific research and the quick and sure introduction of technical progress in all fields in the continuing development of the Romanian economy and in raising our country to new levels of progress and civilization. In this regard, comrade Nicolae Ceausescu pointed out that, "keeping in mind the general trends of world development as well as the power of our socialist industry, it is necessary for us to give special attention to the new technical-scientific revolution so that Romanian industry and the entire economy will be raised to the level of the newest and most advanced conquests of contemporary science and technology."

Workers of all specialties who work in the research, design and production units of the Central Institute for Chemistry greeted the 13th Congress with important achievements. Thus, the 1984 plan for scientific research and technological development, industrial production and microproduction was fulfilled in an exemplary manner, attaining, at the same time, a substantial amount of overfulfillment. The achievements of the work groups in our institute represent an important contribution to the development of the Romanian chemical industry and to the enrichment of the scientific heritage. The theme of the Institute's scientific and technical research program contains, first of all, those objectives slated to be resolved in the special programs coordinated by the National Council for Science and Technology. These are programs which refer to providing the necessary amounts of products from the specific production of the chemical industry for the machine building industry, aeronautics, electronics and micro-electronics and nuclear energy, providing new sources of raw materials and better using sub-products, as well as in the entire problem involving the establishment of technologies and procedures necessary to develop the production capacities of the Ministry of the Chemical Industry in order to fulfill the tasks during the 1981-1985 timeframe and to ensure the achievement of those slated for the 1986-1990 five year plan.

Over the course of last year, we applied to production 83 new and improved technologies and more than 60 facilities were put into operation on the basis of our own designs. We started production and prepared for production, in cooperation with the production units, for over 400 new products and product varieties from the program to reduce the number of imports. A portion of these achievements was realized by way of the microproduction at research units: synthetic rubbers, high-purity reactive catalysts, polymers for rubber items and plastics, laquers and technical paints, varieties of chemical fibers and threads, special adhesives, photo-sensitive materials, auxiliary substances for chemical fibers and threads, organic intermediaries and others.

Microproduction holds a significant place in the activities of our units and this production has grown at a high rate from one year to another. In 1984, the value of the products produced within the framework of microproduction activities reached approximately 700 million lei - nearly three times greater than the figure for 1980 -, with an important contribution to obtaining this level of microproduction being made by the Bucharest Institute of Chemical Research, the Institute of Inorganic Chemistry and Non-ferrous Metals, the Savinesti Center of Chemical Fiber Research and the Institute of Rubber and Plastic Processing Research. Within the framework of these activities a broad range of products was achieved, with the main purpose of reducing the importation of chemical products and substances in different sectors (polymers and chemical fibers, medicines and biostimulants, alloyed and special metals, anti-corrosive products, adhesives and auxiliary products, additives for oils and so forth). By its very nature, microproduction satisfies the very varied demands of the economy and scientific research, especially for those products and varieties of low and medium volume.

The export plan for the production obtained within the framework of the Central Institute for Chemistry was fulfilled at the rate of 130 percent, and the export of projects, documentation and technical assistance - provided primarily by the Institute of Technological Engineering and Design for the chemical industry and the Institute of Research, Technological Engineering and Design for Refining - increased to 1.4 million rubles and $8.9 million.

One practical efficient direction for action and a fertile area for research whose importance was stressed numerous times by comrade Nicolae Ceausescu, the secretary general of the party, is the activity to recover and reuse raw materials and materials resources from the production and consumption cycles, as well as the reuse of energy resources. The recovery of rubber (tires), polyethylene and other plastics, precious metals and scarce substances has been and is an important area of concern and an area where technological solutions have had a considerable economic effect. In this direction, important results have been obtained at the Cluj-Napoca Institute for Chemistry, the Bucharest Institute of Chemical Research, the Institute of Research and Design for the Purification of Waste Waters and the Institute of Rubber and Plastic Processing Research. Similarly, the specialists in the units of the Central Institute for Chemistry have actively participated in numerous actions carried out in industry, having as their objective the attainment of design parameters, ensuring the operation of installations in complete safety and the drawing up of programs and measures to raise the quality and technical levels of production.

The results obtained by the Central Institute for Chemistry are indissolubly linked to the prodigious activities and to the scientific work of high international prestige of comrade academician Dr engineer Elena Ceausescu, First Deputy Prime Minister of the Government, president of the National Council for Science and Technology and president of the Scientific Council of the Central Institute for Chemistry.

The scientific and organizational ideas of comrade Elena Ceausescu can be found in the orientation of the research forces towards the most important directions of current international technology in a close link to the specific nature of our country and the requirements of all of the branches of the national economy. Due to the permanently given guidance and assistance from comrade Elena Ceausescu, the Central Institute for Chemistry today has in its system 23 units for research and technological engineering, design and low volume production, having a modern, encompassing structure which covers all the representative fields of chemical sciences. The institute has a valuable human potential and a significant technical-material base which have allowed, in recent years, the development of the chemical industry to take place at a 95 percent rate based on the results of its own research and technological development.

In accordance with the decisions of the 13th Congress and on the basis of the guidelines and directives issued by comrade Nicolae Ceausescu, the secretary general of the party, the scientific councils of our research units have broadly and thoroughly discussed the tasks belonging to Romanian chemical research. On the basis of this, they have drawn up a vast and involved program of scientific research, technological development and the introduction of technical progress that will best respond to the fundamental objective, the basic tasks for economic-social development and to the priorities established in party documents regarding chemical research.

In conformity with the party's policy in the field of science, whereby research must precede the development of material production, the guidelines established by the Congress for the coming five year plan can also be found, to a good degree, in the activities of our Institute for 1985.

Drawn up under the direct guidance of comrade academician Dr engineer Elena Ceausescu, the plan of activities of the Central Institute for Chemistry for 1985 deals with varied directions and problems of great current interest, such as: obtaining elastomers and special plastic materials, carbon and polyester fibers, special products for the aeronautical and nuclear energy fields, luminous substances for cathode ray tubes, reactive agents and other substances of high purity, special-purpose catalysts, new types of medicines and biostimulants, film substances, pigments, dyes and auxiliary textile substances for the leather industry and other industrial fields. We foresee that in 1985 we will apply in production 235 finalized technologies and start production on over 250 products and varieties in new facilities, existing facilities and experimental production installations.

Another 250 technologies, also finalized, are to be implemented during the 1986-1988 period on the basis of the achievement and start up of the investment projects that have been scheduled in the development program of the Ministry of the Chemical Industry. This refers to products in all the specialized fields of the chemical industry: polymers, synthetic rubbers, dyes, pigments, intermediaries, technical items made of rubber and plastic, detergents, auxiliary substances, pesticides and intermediary pesticide substances, medicines, biostimulants, lubricants, inorganic products, catalysts and others. By applying these technologies, there will be an increase in the percentage of production of fine synthesis products and those products with a higher export value.

Within the framework of microproduction activities, in 1985 we forecast the attainment of approximately 1,400 product types, of which 150 types will be new ones in various fields: medicines for human and veterinary use, chemical and electronic sensors, photo reactive substances, food flavorings, chemical auxiliary substances having various uses, chemical fibers, polymers for technical applications and fine chemical products.

Among the guidelines referring to the 1986-1990 future period, we can stress on a priority basis those regarding the development of fine synthesis chemistry, low volume production of certain products, ultra-pure materials, semiconductors and microcrystaline products. Special attention will be given to research into the promotion of synthesis technologies for certain new types of rubbers and plastics, the better use of crude oil and natural gas and the growth in the degree of chemicalization of well gases and coking tars. Important stress will be placed on obtaining hydrocarbons that can be chemicalized, providing certain new energy and raw materials resources as well as certain simpler and more efficient synthesis technologies, and modernizing technologies and facilities. New research will be carried out for the better use of medicinal plants and apiarian and animal extracts.

With efforts continuing to be concentrated towards applied problems, forward-looking fundamental research will, at the same time, be promoted, which will express the our country's consistent efforts for the affirmation of Romanian science and its active participation in the enrichment of the world treasury of knowledge in all fields. The subjects of fundamental research deal with the directions of research in chemistry, with stress on the synthesis of polymers, physical chemistry, analytical chemistry and chemical bioenergetics.

In order to stay with the current world trends in scientific research, as well as those of the future, at the initiative of and with the support of comrade academician Dr engineer Elena Ceausescu not long ago the Institute of Chemical and Biochemical Energetics was established having a diverse charter for the purpose of introducing unconventional procedures - which will have some of the most spectacular economic effects - in the fields of new sources of raw materials and energy, electrochemical synthesis, better use of biomass and expansion of biotechnologies. The institute's program is in full stride, expecting to obtain certain especially important results for the coming stage.

On the basis of the fertile areas of stimulating their own thoughts and the technical creativity of the cadres within the system of the Central Institute for Chemistry, remarkable results have been obtained in the field of creating original technologies and patenting these technologies. Among the more than 5,000 inventions in the field of chemistry, a significant percentage was accomplished by groups composed of research specialists. Research and design units are also the holders of patents for over 800 inventions. The units of the Central Institute for Chemistry were present at the exposition celebrating the 40th anniversary of the glorious act of 23 August 1944, showing 100 inventions and having 16 win awards.

In domestic and foreign periodicals, numerous articles and scientific reports have continued to appear, attesting to, in this manner as well, the broad and fruitful scientific research activities promoted by the Central Institute for Chemistry. Under the aegis of this institute, in recent years we have seen organized various symposia, meetings and roundtables, some of which had international participation.

In 1984, as in the preceding years, authoritative scientific works were published both in-country and abroad, at the front of which were the scientific works of comrade academician Dr engineer Elena Ceausescu. The works, "The Stereospecific Polymerization of Isophrenol" and "New Research in the Field of Macromolecular Compounds," have continued to stir the interest of scientific opinion abroad. Evidence of this is seen in their translation into Russian, Chinese and Spanish, which has brought about editorial expressions having a broad echo and many occasions for honoring the prodigious activities carried out by comrade academician Dr engineer Elena Ceausescu.

One characteristic of our research activities is the effort to create certain complex groups composed of researchers, designers, technologists and teaching faculty, groups that will deal with problems having economic impact, such as: increasing the efficiency of various facilities, better using recoverable and reuseable materials, recovering secondary energy resources, resolving certain ecological problems and reducing the consumption of raw materials, fuels and energy.

A result of the fruitful cooperation between researchers and designers is also the complex installations built abroad. Along this line of thought, we can mention the important industrial projects such as: the refineries at Banyas (Syria), Zarqa (Jordan) and Anatolia (Turkey), the tripolyphosphate and sulfuric acid complex at Homs (Syria), the acrylic fiber plant in North Korea and others. For these projects, the documentation and designs were produced through the promotion for export of Romanian designs for technologies and installations. A series of other technologies and installations in fields where we have acquired considerable experience - production of chemical fibers, polymers, synthesis and processing of rubber, petrochemistry, the inorganics industry, medicines and other areas - is prepared for offer to foreign partners.

AMong the activities of the units belonging to the Central Institute for Chemistry, a significant role continues to be played by the efforts to produce programs for the more accentuated growth of labor productivity and for raising the technical and qualitative levels of products. In this priority area, in addition to the efforts to have a better organization of production and labor and to consolidate technological and production discipline, research is being called upon to make an essential contribution. Without this contribution, it will not be possible to attain the levels of productivity established for 1990 in the chemical industry (of 236 percent compared to 1980) and to increase the competitiveness of Romanian products on the foreign market. In this regard, in concentrating our attention on the problems of technical creativity for the purpose of obtaining certain higher parameters in all scientific research activities, we are working to carry out certain sustained actions to implant in the awareness of all personnel a greater sense of responsibility in the area of the economic efficiency of research activities.

The directives of the 13th Congress call for the development of the chemical indsutry at an average annual rate of 8.5 to 9 percent and the priority orientation of this industry towards the higher processing of raw materials. In accordance with the objectives contained in the Directive governing fine synthesis chemistry, low volume production, higher processing of crude oil, production of chemical fertilizers, chemical fibers and threads, pesticides, medicines, rubber and plastic materials, laquers, paints, dyes and organic pigments, the future stress in research activities is directed towards complex directions and problems, such as: producing elastomer structures that are more resistent under difficult conditions and during aging, starting the polymer process by way of new systems, producing new types of ion exchanges having different functional operations, increasing the degree of processing of crude oil through selective cracking using polymetallic catalysts, expanding the use of synthetic zeolytes and enzymes in industrial catalysts, and the synthesis of intermediary substances having a high specificity for pesticides and medicines.

Research will be carried out on membranes on the basis of tensioactive substances for biologic transfer. In order to improve selectivity, aspects will be investigated dealing with the use of electromagnetic and ultra-accoustic fields in the chemical industry. In the field of biotechnologies, research is to be undertaken regarding obtaining new types of micro-organisms necessary to the processes for producing mononuclear proteins through genetic engineering techniques, as well as for using micro-organisms in the process of extracting metals from poor-quality ores. Among the concerns of the inorganic industry, we can note the perspectives for obtaining certain inorganic polymers or organometallic and organoceramic complexes having resistent qualities at high temperatures and in corrosive environments, as well as for better using certain certain compounds from sea water and geothermal waters. These several subjects certainly are a sampling; they do not exhaust the existing concerns within our research institutes and centers.

In accordance with the foreign policy of our party and state - of peace and friendship between peoples, of economic and scientific-technical cooperation with all countries -, the researchers in the field of chemistry are more and more intensely participating in international scientific affairs. The Central Institute for Chemistry is cooperating with similar institutes in other socialist countries and non-socialist countries on the basis of documents for bilateral and multilateral technical-scientific cooperation that have been concluded by our country.

Mobilized by the generous ideas contained in the documents of the 13th Party Congress, we will follow - with strong conviction - the urgings of comrade academician Dr engineer Elena Ceausescu that were presented from the high tribune of the Congress, whereby "all scientific and technological research has the high responsibility to the party and the people to be in the front ranks of technical progress and to create new modern technologies in all fields that are needed to carry out the objectives of intense development in industry, agriculture and all sectors of activity."

The workers in chemical research are determined to make all efforts, with self-sacrifice and devotion, for the purpose of carrying out their tasks at a high technical level within the plans for scientific research, technological development and the introduction of technical progress so as to thus increase their contribution to the work of building a multilaterally developed socialist society in our country and to the growth of Romania's prestige throughout the world.

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